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THE work of erecting Townshend Hall has begun again in earnest. There was some delay during the winter months caused by the suspension of work until more time could be secured upon the contract. The former contract for the building was limited to March 10, but seeing that it would be impossible to come within the time limit, the time was extended to July 10. The work is now progressing rapidly, and we hope to have our new building ready for occupation by the opening of the next college year at the furthest.

THE subject of forestry as concerning national interests seems to be coming to the front as one of great importance. Most of the great powers in Europe have their forestry schools, which are under the direct control of the government, as are the military schools at West Point and Annapolis under the control of the United States government. In these

schools a fine course of instruction and rigid rules of conduct are administered and enforced, and the graduates receive positions under the government as do the graduates of the U. S. military academy. These nations are awake to the extreme importance of the correct and proper treatment of their forest resources as concerning the welfare of the country at large, and we can well draw a lesson from them.

WE are all glad to welcome the opening up of warm weather, when athletics will again enliven college affairs. For some time our baseball manager, Mr. Kirkpatrick, has been busy getting hold of "material" for the team, and he has been unusually successful. From all appearances at present the prospects for O. S. U. in baseball look very bright for the coming season. The opening game of the season was played with the team from the Deaf and Dumb Institute, O. S. U. winning by a score of 22-13. Three new batteries were tried by O. S. U., and all did fair work. The weakness in our team this season will probably be in the position of catcher as we have no trained man to hold this place down, but some new men are fast developing. Our outfield will be unusually good, and the infield needs no comment as most of our old heroes are back and in the game.

An Error Corrected.

We are in receipt of a letter from Vice Director Patterson of the Maryland Experiment Station, in which he says: "I wish to call your attention to some errors in a recent number of the Agricultural Student, page 184, in an article entitled 'A New Use for Corn Fodder.' The writer of the article is evidently misinformed as to what part of the fodder is to be used in war vessels and what part for cattle foods. A description of these matters,

as given in Bulletin 43, of this station, will correct this error."

We give below the description of this product as described in the bulletin above mentioned:

"Field cured corn fodder, after having the ear removed, contains about one pound of pith to every fourteen or fifteen pounds of blades, husk and stalk.

"In the process of the extraction of the pith, the blades and husk are first removed, and the stalks are cut up in small pieces. After the extraction of the pith from the stalk the balance is ground up into meal, which in general appearance resembles coarse bran, dried malt sprouts or brewers' grain. This ground material is termed the 'New corn product,' and is the material which has formed the basis for the investigation.

"Considering the fact that these products form so large a proportion of the fodder, it is important to know the value of them in order that farmers may get as great a return as possible for their crop."

Civil Service Examination.

There will be a civil service examination held at the government building, Columbus, Ohio, April 26, 1897. The system of civil service examination has been changed, as perhaps is not generally known. The civil service commission now offers examinations for eligibles for "Assistant, Department of Agriculture;" and from the eligibles thus secured, appoints to the vacancies which occur those eligibles who are best fitted to fill the position. At present there are nine students in the College of Agriculture who have signified their intention of taking the examination.

Columbus Horticultural Society.

The Society held its last meeting in Horticultural building, Ohio State

University, Saturday, March 27, 1897, at 2 p. m.

Reports were made by special and standing committees, and these were followed by the regular program, which was as follows:

Paper, Planting Trees for Timber—Mr. C. D. Burson.

Paper, Our Most Important Forest Insects—Prof. D. S. Kellicott.

Paper, Nut-Bearing and Ornamental Plants—Prof. W. R. Lazenby.

The papers were followed by interesting discussions.

In the business meeting Dr. Edward Orton was elected to life membership.

Baseball Notes.

The O. S. U. team met the braves from the U. S. Barracks on Saturday, April 10. O. S. U. had the best of it from beginning to finish, and when the game was over the score stood 24 to 6 in their favor. If O. S. U. continues the work she has been putting up, we will have a winning team this year. The boys have hardly been tried yet, as both games were easily won. The team on Saturday played as follows: McKee r f, Sayer 3b, Saxbe l f, Ball 1b and p, Magley c f, Kiumm 2b, Bauer ss, Tyler c, Culbertson p and 1b. Other promising men are Hawkins, Leonard, Davis, Roy and Bond.

Every one is sorry to hear of the loss of Captain Jack Reed, who is not in school this term. Reed is the best third baseman we ever had, and his loss cannot help being felt. George Ball has been elected captain. He will play his old position in the box.

Hawkins, Bond and Tyler are all out for the position of catcher, and all caught in the opening game, while Culbertson, Leonard and Davis are aspiring to twirl the "sphere."

Jerry Bauer is back at short, and is playing the same swift, hard game—a little faster than ever if anything.

"Red" Krumm is holding down second and doing good work.

Sayre at third is doing good work. He is new to O. S. U., but not new to the game, as is shown by his work.

The outfield will probably be as follows: Saxbe, left; Magley, center; and McKee, right. Saxbe is a new man at O. S. U., but an "all right" ball player. Magley at center needs no comment. His work on last year's team was of a high order. McKee is a sure man and can cover lots of ground.

The schedule for the season is as follows:

April 19, Univ. of Michigan at Columbus.

April 24, Otterbein University at Columbus.

May 1, Ohio Wesleyan at Delaware.

May 3, Indiana University at Bloomington, Ind.

May 4, Depauw University at Greencastle, Ind.

May 5, Northwestern University at Evanston, Ill.

May 6, University of Michigan at Ann Arbor, Mich.

May 7, Western Reserve Univ. at Cleveland, O.

May 8, Oberlin College at Oberlin.

May 15, Ohio Wesleyan at Columbus, O.

May 20, Western Univ. of Pennsylvania at Columbus.

May 21, Oberlin College at Columbus, O.

May 28, Washington and Jefferson at Columbus.

May 29, Depauw University at Columbus.

June 5, Western Reserve University at Columbus.

June 14, O. W. U. at Delaware.

June 15, O. W. U. at Columbus.

Townshend.

Following are the programs for Townshend for the past month:

Program, March 18.

Paper.....Brown
Talk.....Miller
Current Events.....Alvord
Debate: Affirmative, Givens, Parsons; deny, Galehouse, Steward.

Question: Resolved, That agriculture should be taught in the township High schools.

Program, March 26.

Reading.....By Mrs. Beattie
Declamation.....Hoff
Paper.....Bear
Debate: Affirmative, Henderson, Waid; negative, Thompson, Shellabarger.

Question: Resolved, That the Experiment Station should be in connection with the Agricultural College.

Program, April 1.

Paper.....Waid
Declamation.....Goddard
Paper.....McClelland
Current Events.....Bowsher

This being the night for the election of officers the debate was dispensed with. The following officers were elected for this term:

President.....M. R. Shellabarger
Vice President....C. W. McCullough
Recording Sec.....V. H. Davis
Cor. Secretary.....E. O. Fippen
Critic.....J. A. Thompson
Treasurer.....W. H. Gilmore
Librarian.....H. B. Goddard
Sergeant-at-Arms.....H. C. Price

Executive Committee — P. Baer, chairman, J. S. Parsons and H. E. Manville.

Program, April 9.

Paper.....Fippen
Declamation.....Loomis
Paper.....Miller
Current Events.....Mooney
Debate: Affirmative, Henderson, Aten; negative, Cunningham, Alpeter.

Question: Resolved, That postage on letters should be reduced to one cent.

The Process of Ensiling Corn.

Methods of preserving green fodders date back to antiquity. The ancients buried their fodder in pits in the ground to hide it from their enemies or preserve it for future use ; but not until recently has the method of preserving green fodder in the silo been generally practiced.

The modern silo has come to stay. It is, by many dairymen, considered an indispensable adjunct to dairy farming. The corn plant is the crop most generally used for ensiling. This plant, well preserved, has a high digestibility as compared with hay. To this fact should be attributed in a large measure the great favor with which the corn plant, preserved in the silo, is regarded as a milk-producing food. What has been supposed to be due to the influences of fermentation in the silo, is really due to the superior quality of the plant. If it could be as efficiently preserved in some other way it would be just as valuable for food as when ensiled. But in no other way can the crop be so economically harvested and both grain and stalks so well prepared, almost regardless of the vicissitudes of the weather, as in placing it, when at its maximum food value, in the silo, where it needs no further care or expense until feeding time.

The remarks previously given regarding the proper time to harvest corn fodder applies with equal force to harvesting for ensiling. In preparing the fodder for the silo it should be cut fine, as it packs better than when coarse, and the nature of the silage will depend largely on the packing. If the fodder is dry and coarse it will remain somewhat loose in the silo, and the temperature during fermentation will rise to a high degree, and the result will be a somewhat dry, sweet silage. In this class of silage the white mould is very apt to develop, which renders it objectionable. On the other hand, if the fodder is very

young and heavy, and is packed very tightly, the temperature during fermentation will be comparatively low, and a heavy, soggy, sour ensilage will be formed which is not very palatable. These are the two extremes, and judging from the way the cattle relish it the best is probably an average between the two.

Among the most important points which can be made for silage is the fact that it is a palatable feed ; animals like it, and when they become accustomed to its use, seldom tire of it. Its action is similar to that of grass in that it acts as a mild laxative, keeping the system in good tone, and also furnishing the succulence necessary to a continued heavy flow of milk.

Several important experiments have been made by the stations on corn fodder vs. silage, and the general trend of these experiments seems to prove silage slightly the best, especially for milk production. The Vermont Station found the loss in dry matter to be about the same in degree and kind for properly cured corn fodder and silage. Though the loss in dry matter is usually greater in fodder, the average loss in silage is about fourteen per cent. of the total dry matter. The same station found that, reckoned on the basis of the actual value of the milk and butter fat produced, 100 pounds of silage was equal to 109 pounds of corn fodder ; and in another case one acre of silage was equal to one and eight one-hundredths acres of corn fodder. These comparisons were made with properly cured corn fodder ; but, comparing the average silage with the average corn fodder through the country, the gain would undoubtedly be much larger for silage.

M. I.

Plow Tests.

The students of the class of farm equipment, under Prof. W. D. Gibbs, have made several tests of this impor-

tant farm implement. The results of this, no doubt, will be as interesting, if not more so, than the harrow tests recently reported.

These trials were made on the same ground that the harrows were tested upon. During the time which intervened the ground was packed again by heavy rains, so that the soil was almost as solid as if it had not been touched. The Imperial plow was used. The width of the furrow in all the tests was ten inches.

In test No. 1 the depth was $5\frac{1}{2}$ inches, which required a draft of 425 lbs. for each foot passed over, and moved approximately 660 cubic inches of soil. In test No. 2 the plow run 6 inches deep, moving 720 cubic inches for every foot advance, which required a draft of 475 lbs. In test No. 3 the depth was 8 inches, which required a draft of 525 lbs. for every foot passed over, and moved 960 cubic inches of soil. In test No. 4 the depth was 9 inches, which registered a draft of 575 lbs., and moved 1,080 cubic inches of earth for every foot advance. In test No. 5 the depth was 11 inches, which required a draft of 725 lbs., and moved approximately 1,320 cubic inches of soil for every foot passed over.

At this point the rolling cutter was attached, which run 5 inches deep.

In test No. 1 the plow run $9\frac{1}{2}$ inches deep, and required a draft of 700 lbs., and moved 1,140 cubic inches of soil for every foot advance. In test No. 2 the plow run 8 inches deep and registered a draft of 600 lbs., and moved 960 cubic inches of earth for each foot advance.

Thus we see that the draft is increased considerably more by the attachment of the cutter. In test No. 3, without the cutter, the depth of furrow is the same as No. 2 with cutter, but latter required 75 lbs. more power.

C. W. M.

The Farm Laborer.

When the spring begins to open up and the time draws near for the vast army of farm hands to enter upon their duties under the direction and supervision of the many farmers all over the land, who hire their help, I always think of the time when I was myself in their ranks. The first of April is the usual time for hired help to begin, unless they are hired by the year; and always when this time rolls around I look back only a short time when every spring I started in for an eight months' siege, through thick and thin.

The farm laborer is in a greatly different position, in widely different circumstances, from any other laborer that may be mentioned. The vast majority of laborers work according to some system and put in a certain number of hours each day; but the farm hand is seldom permitted to enjoy such privileges. There are some farmers, however, who do go according to a system and ask their men to work but ten hours a day; but they are few.

It is believed by some that it would be better for the farmers if they would adopt the ten-hour plan; but it is not the object of this article to discuss that question.

It is quite often absolutely necessary to work late in order to get a certain piece of work done. In harvest is usually the time when this is most likely to occur. This, as I said, often happens, and it is all right; no good, honest fellow will refuse, if his employer asks him to help out in such emergencies. But on the other hand the farmer who hires should be careful that he does not fall into the habit of wanting a fellow to work late all the time.

Now it is not my purpose to write anything that may have a tendency to breed discontent among boys who have hired out on the farms. It is the last thing I would think of doing;

but I simply want to call attention to some of the unpleasant circumstances with which the farm hand is sometimes surrounded.

A great many farmers regard their hired boy as a mere machine, hired for a certain length of time; and he seems to think it is his duty and privilege to get as much out of him as possible. They expect him to work day after day from before daylight until after dark for weeks and months, and never stop to think that he is built just like any human being and needs rest occasionally. If the boy makes a mistake or misunderstands some orders he is severely reprimanded and no explanation of the case will be accepted. I have known men to severely reprimand their hired man for something which they did themselves; for instance, leaving a horse untied in the stable, or forgetting to turn out some of the cattle or sheep. A person should think before he does anything rash, for he may be the sole cause of the trouble himself.

These are not mere whims or suppositions, for I have been treated so many a time myself, and know just how it goes.

Some farmers, too, are very particular about the time. Their man works by the month, and if he happens to lose a half day it is taken from his wages; the farmer never thinking of the late hours his man may have worked on many occasions when the work was crowding. I think that when a fellow is willing, and tries to do what is right, the employer should give him a word of encouragement and show that such willingness on the part of the hired man is appreciated.

I have often noticed this one fact, namely, that the farmers who have themselves worked on a farm by the month in their younger days, are, in nearly every case, the best men to work for. They know what a day's work is; they appreciate a good, trusty

hired man and they treat him as such a person should be treated.

I should feel very badly if this article should cause discontent to arise in the heart of any young farmer lad, and I hope it will not have that tendency. I believe that a fellow should never refuse to do a reasonable amount of extra work, if there is a reason why such should be done. If he may be in the field ready to haul in and a load happens to remain at quitting time, never refuse to go promptly after it, if your employer so desires; and if he is a man he will repay you in some way.

D. K.

Raising Chicks With Brooders.

As the raising of poultry increases, the use of brooders is becoming more general.

From what experience I have had with them in connection with the poultry work here, I am assured that they are an excellent thing, and if I were to go back home and raise chickens as I have done in the past I should add a couple of brooders to my outfit.

There are a few limitations to their extended use; for instance, it would not pay to use them unless you intended to raise quite a number of chickens, say 100 as a minimum, for one brooder will not be of any great advantage, especially if you are using the old-fashioned incubator; for as you well know, the hens cannot all be induced to set at one time. You do well if you have five or six to set at the same time. This being true, you will have broods coming off at different intervals. Now you cannot put chicks, just hatched, in with those two weeks old without disastrous results. Hence the necessity of more than one brooder.

Besides, the ordinary brooder is limited as to the number it will accommodate. Too much crowding is to be avoided, especially in cold weather, for while the animal heat

tends to keep up the warmth in the brooder, at the same time the chicks tend to crowd around the warm spot, for most brooders are so arranged, and properly so, that they are warmer in one place than another.

While the ordinary brooder and yard is quite expensive as bought from the dealer, much cheaper ones can be made which yield as good results as the more expensive ones.

Whether buying or making, I would not recommend any of those heated directly from the lamp by introducing the heat directly in the chamber, or as applied to the floor beneath, because the heat supplied is directly dependent upon the lamp, and if, as sometimes happens, your lamp becomes extinguished in a short time, your chicks will be chilled. A properly constructed brooder should have a hot water tank, with a capacity of say two gallons or more. This should be so arranged in the brooder that the chicks can get all around it for warmth, and if it becomes too hot they can retire to the corners where it is cooler.

A brooder effects considerable saving in food, because, as a general thing, chicks are fed more expensive food than the hens. As it is usually the practice, where hens are used, to throw the food down where all can get at it, a much greater quantity is used than is necessary. This, of course, is avoided with a brooder.

Also considerable valuable "hen time" is saved, for you can either set your hens again or you can break them up and start them at work again instead of using two or three months of their time in raising the chicks.

In regard to feeding in a brooder, much care is necessary. In the first place the chicks should be fed often, but not very much at a time. Feed five or six times a day, but never overfeed. If you have been forehanded you will have used a tester,

and will have some otherwise worthless eggs for first feeding. Among other foods rolled oats is to be recommended as excellent, and not very expensive.

Corn meal is all right if properly used, which use consists in not using too much. Cracked wheat makes a good food after the chicks are a little older. Combinations of rolled oats, corn meal and cracked wheat are good.

If you are feeding ground bone to your old chickens, try feeding the chicks some of it. Fine ground oyster shells should always be kept within reach of the chicks. Provide a yard in which they can run, and catch flies and get something green to eat. Throw in a few shovels full of gravel. But no matter how well you feed, the element of success lies in keeping the brooders clean. See that they are cleaned often, and that they are thoroughly cleaned.

With the proper care more chickens can be raised with brooders than with hens, and I believe it would pay most farmers to have them, especially if there is an ambitious boy about, who is always wishing for something to make. The farmer is usually removed from the meat markets, and what better meat can he raise than chicken meat? And by the use of brooders he would be enabled to produce it cheaper and to produce more.

The progressive farmer, like the progressive man in any business or profession, is constantly on the lookout for a paying investment. It is generally conceded by business men that to be successful one must keep in touch with the world, and especially with the business world in which he moves. To do this he must read some capable newspaper. No better investment can be made at the present time than to send us \$1.10 for the *Rural New Yorker* and AGRICULTURAL STUDENT for one year.

Nativity of Some of Our Breeds of Chickens.

From Asia—Brahmas, Cochins (China), Lanshangs (China), Sumatras, Malays, Silkies, Frizzled.

From Europe—Leghorns (Italy), Hamburgs, Polish (Poland), Houdans (France), Dorkings (England), Andalusians (Spain), Sultans, Runapless, Spanish (Spain), Minorcas (Spain).

From America—Plymouth Rocks (New England), Wyandottes, Black Javas, Dominiques.

ADVICE TO FARMERS.

How to Market Their Crops to the Best Advantage.



LETTERS from hundreds of points over the grain states tributary to Chicago contain inquiries about "how the farmer's car of grain is handled" in Chicago. Many farmers before shipping their first car appear to have the idea that there is some mysterious system through which their consignments may pass and never be heard of again. They master the problem of ordering the cars and filling them at the home station. They find the filling out of the shipping bill a simple matter as soon as they try it. But what of what will become of their grain in Chicago? First, then, everything is open and above board, from the minute the car door is locked and sealed, until the Chicago draft is cashed at the home bank. The railroad is responsible until the grain reaches Chicago. The deputies of the Chief Grain Inspector of Illinois are responsible for the grading. The official weighmaster who knows neither buyer or seller says how much the car contains. The Farmers' Commission House is responsible for selling the grain, by a

sample taken from the car, at the very best possible price and sends by mail account of sale and draft for same. Every act performed by the railroad company and its employees, by inspectors, by weighers, by commission house, each and every act is subject to review by the Illinois Railroad and Warehouse Commissioners, and by the officials and committees of the Chicago Board of Trade. The least complaint is investigated by these officials. Thus the farmer's consignment is as safe as if he were with the car every moment, from the time it leaves the home station until its contents are emptied into a Chicago elevator. Those who have tried direct shipments are surprised at the simplicity and safety of the plan. But there is another side to grain shipping. The farmer must be open and above board. He cannot dump half a dozen wagon loads of inferior grain in the bottom of a car and then fill the top of the car with grain of fine quality. If he does, it will all grade as poor as the poorest. Inspectors use long samplers which they bore into top, bottom and center of every car. Dirty, damp or inferior grain will come out in the official samples. Then they grade the grain low, then it sells at a low price. Do not attempt to cover up anything. If grain is dirty, clean it before putting in the car. Well cleaned grain frequently brings a surprise to the shipper by bringing a cent or two more than expected. The Chicago market has buyers by the hundred. They represent every interest which consumes grain of all kinds. The big millers are after wheat, the brewers are after barley, the sugar refiners are after corn, the oil trust agents are after flax seed and the eastern shippers are after all grain which is on sale. With such competition it pays to be honest and careful in preparing grain for market. Remember there is nothing covered up in the Chicago

market. Clean grain shipped direct by the producer commands the greatest amount of cash possible from the farm. Here is what a few farmers who have tried direct shipments say: Mr. P. H. McGovern, of Elgin, Minn., says, "I am very much pleased with the sales of the four cars of barley I shipped to you. I made over \$100 better than selling at home". Mr. George Mettendorf, of Tuscola, Ill., writes, "Both of your checks at hand all O. K. I am well pleased with the proceeds. I made 53 cents per bushel more on my seed than if I had sold to a grain man here". Mr. M. R. Van Schaick, of Rochester, Minn., says, "Yours of the 16th was received with check for \$194.17. I made \$30 on the shipment". And we have hundreds of similar letters.

H. H. CARR & CO.

Distribution of Seeds.

Of all the works of nature none are more interesting than the way she provides for the distribution of the seeds of different plants.

We know that trees and plants of the same species are found widely distributed over the world. Now these plants must either have originated in different parts of the world, or they must have originated in one place and gradually extended their area until at last they have reached the whole world. The latter is the most probable for the reason that it would be exceedingly difficult to find two plants that we know to have originated far remote from each other which possess exactly the same characteristics and regularly transmit these characters.

On studying the seeds of different plants and trees we find that nature has provided unique means for their distribution. Each plant has its special means which is best suited to its own particular case. For instance, the more delicate seeds have hard coverings which necessarily make them heavy, hence could not well be

carried by the wind as they would soon fall to the ground instead of traveling through the air for many miles as do some of the lighter forms. But these hard shells aid in their distribution in another way; they protect the germs from water so that they may be carried in water for many miles, and in some cases it is thought across the ocean, without injuring the vitality.

Then there are the fruits and berries with their high and attractive colors that are sure to attract the attention of birds and other animals. The animals eat the fruit, but the seeds, in most cases, pass out of the body unharmed by the process of digestion. Seeds in this manner are carried enormous distances by migratory birds. Then there are those provided with hooks and awns, the much dreaded "stick-tight," which fasten themselves to animals and birds, and are thus carried long distances.

But perhaps the most efficient and most common mode of distribution is that of winged fruit and that covered by pappus, which are carried on every breeze at harvest time to great distances, and as they continue to ripen for some time they get distributed in every direction both far and near.

When we first think of a species originating in one place, we think it is impossible; but if we stop and consider the probable time it has taken we can readily see how it has happened. Seeds that are carried many miles this year establish themselves, and in a few years send their seeds on as much farther as they were carried themselves; as the dandelion, which was introduced into this country comparatively few years ago, spread to the westward from the Atlantic coast with so much regularity that it could be told approximately how far its boundaries would reach the following year, till finally it reached the Pacific coast, and now it is one of the most common weeds of our fields.

In regard to species common to different continents, we must remember that their existence dates back to before the ice age, as we find traces of trees in the ice of the North today. Then there was vegetation clear to the poles, and it was comparatively easy for seed to be carried from one continent to another by way of the islands. Of course many seeds distributed by these different agencies never produced plants because of inadaptation to the climate and soil in which they were planted; and those that do grow under such conditions often produce plants so modified by the conditions that they have but few points in common with the parent plant.

A. W. NETTLETON.

Origin and Nature of Soils.

BY PROFESSOR W. D. GIBBS.

Nothing is more common than the soil under our feet. We walk over it every day of our lives, and yet how many of us stop to consider it? Where does it come from? How was it formed? And what is its use?

To the mind of the average person the soil is nothing more than mere dirt, something that is essentially unclean and unworthy of notice, much less of careful study and investigation. In recent years science has done much to dignify and make beautiful and interesting things that were commonplace and insignificant. The growing plants, the beautiful blossoms, the luscious fruit used to be considered commonplace and uninteresting until science revealed the wonderful complexity and beauty of nature's laws. The substance water is not, in itself, interesting. We know that it is heavy, that it is wet, and that it is necessary to life; and here our knowledge ends. But when science explains that water is composed of two invisible gases, the union of which forms the sub-

stance which we see and feel, and that these same two gases are found everywhere; that we could not live without breathing one of them; that they enter largely into the composition of all plants and animals, then we are interested, and the commonplace substance has a higher and broader meaning. So it is with soil. The searchlight of scientific investigation has revealed new and interesting facts about the very dirt which we scrape from our shoes.

Our eyes have been opened and we find the subject full of interest and worthy of careful study and investigation.

If you take up a handful of soil and examine it carefully you will see many mineral fragments, which look like small stones. That is what they are. All soils are composed very largely of pieces of stone. In a gravelly soil these pieces are large, some of them good sized pebbles, or even larger, possibly boulders several feet in diameter. If you examine a handful of clay you apparently do not see mineral fragments, but under the microscope this same clay looks like sand to the naked eye. You will see little pebbles, larger stones and huge rocks. But when measured even these boulders are found to be .001 of an inch across or less. In fact soils are composed, mainly, of these particles of varying sizes, larger in gravel or sand and smaller in clay or loam.

The fertility of a soil depends largely upon the size of its particles. The mineral food of plants (the portion of the plant which remains as ashes after it is burned) is formed in the soil by the dissolving of the mineral fragments. Naturally, which will dissolve more rapidly, gravel or fine sand? Why will pulverized sugar dissolve more quickly than rock candy? Because its particles are finer and the liquid has more surface to act upon. Thus fine soil dissolves faster than a

coarse one ; hence plant food is formed more rapidly.

Again, take two boxes of the same size, with porous bottoms, and fill one box with coarse gravel and the other with fine sand and pour water through them. Which will retain more water ? The sand you say at once. Hence a fine soils holds more water than a coarse one.

But soils contain something more than broken fragments of worn and weathered rock. If we heat a sample of soil to a red heat, we find that after cooling it it has lost weight. This loss was partly water and partly organic matter. All of our soils contain large quantities of decayed and decaying plants. This decayed material gives to soil its dark color. Muck soils are dark colored because they have a large amount of decayed swamp grass and weeds.

Clay soil has, among its very fine particles, a small quantity of silicate of aluminum, which gives it its sticky or plastic quality. Loam soils have more or less of this same sticky material.

The importance of soil to animal and plant life cannot be estimated. Without it we could not exist. All forms of trees, all kinds of crops would perish, and all forms of animal life, including man, would perish with them. Only a few mosses and lichens would remain to tell the tale.

What are the uses of the soil ?

First: It is an immense whorkshop in which chemical and biological changes are constantly going on. The minute soil particles, or rock fragments, are continually being dissolved and made ready for hungry plant roots. Do you know that the soil is the home of a vast army of living creatures? We never see them; they are too small. They are the lowest forms of life — simple, one-celled plants, in the shape of spheres, or ovals, or short rods. How small are

these denizens of the earth ? In transverse diameter one twenty-five thousandth of an inch is a common measurement. Increase the height of the ordinary man one thousand times and his head would be over a mile above the earth, yet one of these little creatures under the same magnification would have plenty of room to dance up and down in the film of water between two plates of glass pressed firmly together. From one hundred to two hundred and fifty of them placed side by side would make the thickness of an ordinary sheet of paper. These little fellows are continually at work causing decay of vegetable matter in the soil and thus making plant food. They are among the farmer's best friends.

Second: *The soil is a great storehouse of water.* If we always had plenty of moisture in our soils we would have good crops. The soil acts as a large sponge to absorb water and hold it for the use of crops.

Third: The soil is a home for plants; it affords a place in which they live and grow.

Where does soil come from ? How is it formed ? All soils are formed from rock. Geologists tell us that at one time the surface of the earth was covered with nothing but solid rock and water. Now how was the rock changed into soil ? Rocks decay when exposed to the weather. Freshly quarried stone has bright and angular surfaces, while stone that has been exposed to the action of rain and freezing looks dull and the edges are rounded. All rocks absorb water; even the hardest granite will absorb .4 of a pound for each 100 pounds of rock. When the water in the stone freezes the ice expands and breaks off small pieces of stone. Rains come and wash this material away and at the same time wear away the surface of the rock. It does not seem credible that running water could wear away stone, but when we ride through the grand

canon of the Arkansas river in Colorado and see those solid granite walls extending almost straight to the skies for hundreds and hundreds of feet, we are slow to believe that the little river at our feet in its rush through the dark and narrow gorge has, little by little, cut its way through this solid wall of adamant. It fills us with awe to think of the centuries and centuries, the countless ages, that it has taken to accomplish this work.

Running water is a good soil former and soil mover. Every year the Mississippi river carries into the Gulf of Mexico 72 sections of land four feet deep.

Glaciers are another important agency in soil making and distribution. Whenever the climatic conditions of a country are such that more snow and ice are formed in winter than melt in summer this surplus must accumulate year by year. After a while this pile of ice and snow becomes so deep and heavy that great pressure is exerted on the lower layers and the ice begins to flow from underneath. The additions on top of the pile increase the weight and cause the flow to continue. This was precisely the condition of affairs over northern regions in earlier geologic times. This ice flow extended down over the northern portion of the United States as far as the Ohio river, but did not extend over the southeastern and a portion of the eastern part of our state. As this ice flow advanced it ground up and pulverized everything in its path. In fact it is claimed by some authorities that the great lakes were scooped out by this gigantic ice flow. When the ice sheet reached down into our warmer climate it began to thaw. As it thawed and receded vast quantities of soil, bowlders and debris were deposited. The region over which this deposit took place is known as the drift area, and land over which it did not extend is known as the driftless area. Drift soil is the

most fertile soil that we know, because it is deep and composed of a large variety of elements, while the driftless soil has only the elements that are to be found in the underlying rocks, which in many cases are near the surface. This is what makes the difference between the fertile regions of central, northern and western Ohio and the hill country of the southeastern section.

We will look upon the soil, then, not as an inert, lifeless mass of dirt, essentially unclean and unworthy of thought or attention. We will think of it as a live and complex substance in which constant change is taking place, as an immense kitchen in which food is made and prepared for plant roots.

We will remember that all soils are formed from rocks by the action of freezing and thawing, rain, running water and glaciers; that they are made up chiefly of particles of rock of varying sizes; that the fertility of a soil depends to a considerable degree upon the size of its particles; that the soil contains decayed and decaying vegetable matter, and that this material gives soil its dark color and adds to fertility. We will also bear in mind that the soil is the home of countless numbers of minute creatures, too small to be seen, that are constantly at work causing decay of vegetable matter and making plant food.

We will not forget the importance of the soil. Animals, including all the higher forms, from the lowest one-celled protozoan to man, all depend upon plants for food, for life. Plants live upon and in the soil. Without soil all animal life and all higher forms of plant life would be impossible. The surface of the earth would be a bald and barren scene of desolation.

Subscribe for the AGRICULTURAL STUDENT.

Shall We Stop Breeding Horses?

It may seem to touch upon the ridiculous to recommend farmers to continue breeding a class of domestic animals that, in the past few years in the United States, have depreciated in value some \$75,000,000. It might also seem unwise to suggest that farmers continue raising a class of stock for which at the present time there is so little demand and for the future apparently, so gloomy an outlook as for the horse.

Notwithstanding, this is what I am going to do, if you will submit to certain modifications. Is it true that there is no future for that most noble of beasts that for so many centuries has been so closely identified with man? Is this most useful of animals to entirely disappear from our streets and highways to be replaced by a snorting, tooting automotor vehicle that starts and stops at the turn of a crank and consumes fuel not to exceed ten cents per day? I must answer these questions in the negative.

The fencing in of our western plains, the doing away with the cowboy and his mount, has thrown into disuse thousands of small, fleet, tough and wiry horses. These, once useful in the round-up and branding time or "when the herd stampedes", 'tis true, have been forced to give way before the barb wire and the advance of civilization. Now thousands of these bronchos and cow ponies, like the slaves of our south suddenly freed from bondage, are left to shift for themselves, and as a consequence have become enrolled in the category of the ranchman's pests to be shot down like the coyote and the wolf.

The wonderful progress made of late in harnessing electricity and in controlling hot and compressed air whereby vehicles upon iron rails can be made to glide along "swift and smooth as a swallow", has suddenly cast upon us hoards of horses of the

light draft and "general purpose" type, once the farmers' favorite.

The advent of the new model safety with its air cushioned tires, profusely advertised and pushed by wealthy syndicates, was followed by its adoption as a means of locomotion by both old and young until now to own a wheel is the desideratum of nearly every American heart. Young men who formerly were wont to take their fair ladies out on Sunday afternoons behind a hired nag, now ride out with her upon a steed of steel. This has had its effect upon the light livery business and lessened the demand for a class of horses, fleet footed, but of no particular stock or pedigree. Then, further, the tendency among smaller shop keepers and even of larger department stores to deliver goods "awheel", doing away with the "quick order" delivery wagons, has too had its effect upon the demand for lighter strains of horses.

Thus three classes, at least two, of horses for which there was formerly a good demand, and therefore a good price offered, have within the past three or four years been thrown upon a market already dull from the effects of hard times, to be disposed of at prices nothing short of ruinous.

To this we have to add the financial stringency, which like a cloud of gloom has been hanging over our heads since '93. These times of suffering and distress have not only made horse raising unprofitable, but every other business. Professional and business men alike complain bitterly of these times; once lucrative industries in our cities are either not yielding any return at all for the investment or just barely enough is being realized to keep them out of the creditors' grasp.

Our people too have been learning a lesson in economy in the past months that they will not so soon forget. Every household expense has been cut down as much as possible

and not rarely is the family horse sacrificed and sold for what it would bring, that pressing obligations may be met. Then too just at this time there are many factories, rolling mills and other industries, using horses largely, that have not as yet reopened their doors, hence their stock of horses, if not already sold, is not being replenished.

Stock raisers and farmers when the crash came, and horses took their plunge in price, found themselves overstocked and in the process of culling out the best threw them upon an already overcrowded market. By just this method of culling the herd, the best animals have pretty nearly all been bought up by buyers until now the stock on hand is poor in quality; good horses are growing scarce.

Farmers, too, smarting under the experience just gone through with, are reticent about venturing again into horse breeding; not 10% of the usual number of suckling colts are found today upon our farms. "There has never been a time," says an authority, "when the proportion of good horse flesh to the population has been as low as it is now". To be sure there are plenty of ponies, scrubs and 1100 pound draft horses and many of them sound of limb and wind and of not bad exterior, but for them there is no longer a demand.

At the present time and as far into the future as one can see, there are three classes of horses which do now and always will bring a good price in the market: 1. The heavy draft, of strictly choice stock. 2. Good large coachers. 3. Extra fine drivers and well gaited saddle horses.

For these three classes there is now a good demand and a growing demand and no successful device the result of some inventive genius skill, has as yet been found to replace them.

Formerly 12% of our horses were in the street car service and about

5% in light harness (livery, etc.,) service.

Admitting that electricity, steam and the wheel have decreased the demand 15%, I feel confident that the revival of better times, the opening up of new enterprises and industries throughout our land, will bring with them as one of their fruits a greater demand for good horses than we have dreamed of realizing. Another factor of no small significance, is that within the past few years European nations have turned to America to supply them with horses. Quite an export trade has sprung up in the past few years. These conservative foreigners, however, are a particular set, and though willing to pay a good price for a horse to suit their wants and fancy, demand that the animal be of the best grade and choice in every way. Scrubs, ill proportioned and blemished horses they will not take.

Although horses in general have been steadily declining in price, on an average \$1.05 per head during the past year, good horses are in demand and at improving prices. The falling off in the price of scrub horses has been something appalling! The gradual tendency toward a raise in price for good horses is very encouraging.

If the farmer will only breed along the right lines, the future of the horse industry will be as bright as and full of encouragement as any other business. The day of breeding for quantity has passed. The day of breeding for quality is dawning. The man who will start now to breed and develop typical specimens of either of the types I have indicated, with the return of prosperity to our nation, can expect not only to be amply repaid for his money invested, but also for his time and trouble.

In breeding the horse the farmer should always have some specific type in view, some special purpose horse. If he have on hand heavy mares, he might breed them to some heavy draft

horse of not less than 1,800 pounds weight, of good conformation and fair action. By good conformation, I mean a strong, broad back (at loins), massively muscled in shoulder, croupe and hams and broad in the chest. The legs should be in proportion to weight of body, and should be straight, neither bent forward nor backward, nor distorted into awkwardly shaped members as seen from before or behind. The disposition of a draft horse should be mild and gentle, and though prompt to obey, not nervous or easily excitable. As to gait a heavy draft horse should be first of all a good walker, but if forced into a trot should move off with ease and grace.

Where a farmer has a lighter class of mares (1,200 to 1,250 lbs.) it would not be advisable to risk crossing with a heavy draft stallion, experience going to show that these crosses beget too often unsalable chunks or scrubs. While inferior light mares had best be bred to produce mules for work in the mines, a better class of them might well be bred to coachers. In breeding the coacher the breeder should endeavor not only to produce a horse of good size (1,300 to 1,500 lbs.), and of 16.2 to 17 hands height, but this animal must be stylish, showy, of good endurance and tolerably speedy. The coacher is the carriage horse of our luxurient wealthy, and they demand that their coach animals shall be large, high actors, well proportioned and able to road in front of a coach or "brake" at a good pace and do it nicely. This demand, 'tis true, makes this type of horse more difficult to develop than the heavy draft, but nevertheless they bring the best prices in our city markets, being sold to the wealthier classes.

To properly raise such horses they must be forced ahead from the time they are foaled. It requires, too, patience and skill on the part of the breeder to train and handle this class

of horse that they acquire style and some speed.

The light roadster class—the American horse, a product of American skill and ingenuity in horse breeding—is not to be ignored. Just this very class of horses is beginning to attract the attention of the European, and in the past five years we have annually shipped over to Russia, England and Germany hundreds, yes thousands, of our native bred horses. Heretofore the demand has been for trotters, but now the smooth-gaited leg pacer with a "burst of speed" is also sought after.

To the average farmer, equipped as he is with "scrubby," undersized mares, to start breeding for light roadsters, I would hardly recommend to breed to this class of horse. If, however, he can avail himself of mares of good individuality and pedigree, and make size, quality, action and color his chief aim and not sacrifice everything to speed, he will find a ready market and a good price.

Don't be afraid to venture. You may not as easily realize returns from horse breeding as heretofore, but is this not true of every other crop and industry on your farms today? Don't let sensational newspaper articles upon new-fangled automatic, self-running vehicles strike terror to your hearts. There are more of them today in the scrap pile than on the city streets or country highways. Except they run upon an iron track it will always be a difficult problem to apply any of the newer propelling powers successfully to carriages, wagons and omnibuses.

From the day it became apparent that the locomotive could climb a hill and go safely around a curve and that a new means of locomotion had been really introduced, the most dismal pictures were drawn of its effect upon certain branches of industry. The breeders of horses, the drivers of stage coaches, the keepers of wayside inns and taverns, the proprietors of stage

companies, the owners of turnpike stock were all to be ruined. To the amazement of the croakers none of their predictions came true. The same ruin was to follow when Howe first introduced the sewing machine. The poor sewing girl had seen her day, they said, when in reality it was just dawning.

When an ancient mechanic made a wooden bird to fly out and meet him as he returned from his day's labor, they said the problem of aerial navigation had been solved. But has it?

Don't, my friends, stand back and croak about the horse industry and think that all is going to ruin and destruction! Turn to and study the situation and be yourselves convinced of the future outlook. Breed along some specific line to produce a special purpose horse that shall be typical of his class.

Civil Service Reform in the Department of Agriculture.

The importance of the agriculture resources to the welfare of our nation, led to the establishment of the Department of Agriculture. The nature of the work of producing plant and animal products causes the farmer to have to do with so many things, to follow out so many processes, though largely based on empirical laws, have been literally ground into the race. This breadth and settled nature of the work that the farmer has to do, together with the little part that any one man can do, has developed a slow moving and very conservative class of people—a class hard to reach, hard to be aroused to think for themselves.

The spectacle of this large body of people lagging behind—becoming mere slaves—to toil for their more progressive neighbors, drew the attention of statesmen, and led to the formation of this department. And truly it was statesmen of the highest type that set in motion this work, for I verily believe it is today and will

become one of the greatest forces in the developing of the Republic. Thus we see the object of the Department of Agriculture was primarily to educate. Perhaps some will differ—and think of scientific research. But is not the first, and it seems to me the hardest, problem that comes to the teacher—to find out what to teach? Is not science but the classification, the putting into an available form—knowledge that may be useful in future time? I take it that the consideration, development and arrangement of the facts that come to us from day to day, may truly be called scientific work.

Thus it is that scientific work holds a very large and important place in the Department of Agriculture. And confidence in our statesmen is increased when we note the efforts that have been made to take this work out of the political field, and to have the employes selected in accord to their worth and experience instead of according to political parties. During the last administration much progress has been made in this direction, and at the present the department is the best organized—in the way of civil service reform.

The present need seems to be improvement in the way of civil service examination. I understand when a vacancy occurs now, an examination is given to all who apply, and the one who stands the highest gets the place. Much as this is ahead of choosing employes by political preference, yet it has been found in practical experience to be open to serious objection. We want the best men possible in our governmental scientific work. It requires much work and some expense to take the examination, while the chances of getting a place are not very great. Thus it is natural that the best men, those most successful in other lines, are too busy to bother with the examination and the place goes to second class men.

A new plan is now under consideration which seems to be moving in the right direction. It is proposed to hold regular examinations at fixed times and places and anyone passing is made eligible for any vacancy that may occur in the line in which he has been found efficient. The same person may take tests on several different subjects, and thus become eligible for several places. Further, it is proposed to endeavor to fill as many minor places as possible with those on the eligible list, thus making a system of promotion possible and besides giving opportunity for worthy persons to earn a living, and at the same time become better prepared to do good work in the department.

As I understand the description of the new plan, a name is to be kept on the eligible list only two years. I do not see why it would not be better to extend this time to five years.

Examination is, at its best, not a very good test. It is not always the best worker, or the man with the most thorough knowledge of his subject, that takes the highest grades in a test. It seems to me I would rather trust the judgment of a scientific teacher, who has endeavored to teach the young man or woman for two or three years as to his or her fitness for scientific investigations, than I would a written examination. If our agriculture and scientific schools are what they should be, why not depend upon them to recommend the persons worthy to be eligible—filling all minor places possible with scientific, trained men, and then promote as the worth and ability at the work is shown. Seems to me this is simpler and does away with the worry and expense of examinations.

But I would briefly touch on another line of thought.

Recognizing the value of finding out what the farmers ought to know, there comes a question—How to bring this useful knowledge into use.

It seems to me that one of the greatest problems now is, how to reach the farmer.

These are busy times and getting busier. The practical business farmer is finding less and less time to read. Institutes are coming to rehash over and over again many things in which he has no interest, and he feels he had better be at home currying his cows. Bulletins and Institutes have done a good work—and may yet in their proper place. But to help the rank and file of agriculture, it looks to me that they are inadequate.

Some way we must get closer to the toiler, find his needs, furnish the food in a palatable, digestible form when he feels the need of it.

Were you to put it to a vote among the better class of a farming community whether the farmer's bulletins should be sent to every home or whether they should be deposited at one central place where they would be always available, I think some would vote to have a central depository.

I have found a feeling of need of some central place where one might find collected, all the information available on a subject in which he is interested.

Scientific research, especially that carried on by a government, should keep close to the needs of every-day people, and while thinking, study the civil service. It seems to me there ought to be a place for an economic department—filled with as well educated men as possible; but with men having had some practical work, who knew by experience the problems and struggles of the actual business of farming.

Fellow students, if we can put new thoughts into the lives of our neighbors—or better, arouse them to think out new thoughts for themselves—we are doing a better service for our republic than if we carry a musket for her defense.

H. H. LOOMIS.

**Address at Fifth Anniversary of
Townshend Agricultural Society—
By President Homer C. Price.**

We are gathered here tonight to celebrate the fifth anniversary of Townshend Agricultural Society. I have thought it proper to speak for a few minutes upon Agriculture as a vocation. I would not represent agriculture to you as nobler, more independent, more honorable or more healthful than any other vocation, but I would represent it to you as the equal, the foundation and precursor of every other vocation, as the basis of all wealth, prosperity and luxury, and that as agriculture prospers so prospers a nation.

But before choosing a vocation, we should consider its condition, its needs and the prospect it offers for success. Today agriculture is depressed and the wail of hard times is prevalent among farmers. Some have even gone so far as to predict that in the future the lands of the country will be owned by landlords, and that those who cultivate them will be but tenants and hirelings. But the statistics of 1890 do not show agriculture to be in such a deplorable condition. They show that 38% of the families of the United States are cultivating farms, and that 66% of these own the farms they cultivate, and that 72% of the farms owned by those who cultivate them are without incumbrance. How does this compare with the balance of the population that are not cultivating farms? Of this class only 37% own their homes and as large a per cent. are incumbered as of the farms. This shows that 29% more of those living on farms own their homes than of those living in cities and towns.

But notwithstanding these facts it cannot be denied that agriculturists, as a class, have not been prosperous in the last few years. But what class has been prosperous? What business has paid interest on the capital inves-

ted? It has been only too plainly demonstrated that the business prosperity of our country depends upon the prosperity of the farmer. If he has no money with which to buy from the manufacturer, the factories must close because there is no market for their products, men are thrown out of employment and business becomes stagnant.

Many reasons have been assigned for this depression; the politician of the one party tells us it was the "crime of '73"; of the other that it has been the lack of a high protective tariff. Be this as it may it is doubtless true that legislative enactments have materially affected agriculture. However, it seems that the cause of this depressed condition may be traced to a deeper source than legislative enactments. This depression has not come on the American farmer suddenly and without warning; true, laws have passed which hastened or hindered it as they were detrimental or beneficial to the farmer. But I believe it is more largely due to the inability of the farmer to meet ever increasing *competition* in the sale of his products. The markets for agricultural products, with better facilities for transportation, have gradually widened till today they are the markets of the world. Steam and electricity have brought together the four corners of the earth.

Take the wheat market, for example, and watch for one week the information upon which future buying in a board of exchange is calculated. It is not from the condition of the wheat crop in the United States alone but upon telegraphic news of the condition of the crop in Argentine Republic, Russia, India and every wheat producing country of the globe. What is the effect of this? The American farmer is compelled to compete with cheap labor on cheap soil and carried on with the latest improved agricultural machinery. As a consequence he is often compelled to sell his pro-

ducts for less than the cost of production. But these are new conditions; we did not always have such facilities for transportation; our competition was not always so sharp.

The American farmer has been slow in adapting himself to these conditions; he has not realized that he must stop producing the crop to which his land and market are not peculiarly adapted; in other words, that he must specialize, that he must study his markets and find out what they want and whether he can produce it profitably. He cannot go on blind to the wants of trade and surrounding conditions and expect to reap success.

Do you say that if this is the condition of agriculture, it has few inducements for an ambitious young man? It is not so; the greatest need of agriculture today is to have energetic young men, properly trained, to return to the farms and help solve these problems. Our experiment stations are doing much in this line, but they cannot meet the peculiar exigencies of every locality. This can only be done by sending into every locality men trained for the work, that will make a careful study of these questions of competition and profitable production, and for such men there is an abundant reward in store.

But the immense progress that has been made in agriculture through the appliances of science and the inventive genius, requires that the young man, who chooses agriculture for his vocation now, shall have a very different education from what he would have needed a half a century ago. Today it requires that he shall have a trained mind as well as a trained body; that he be naturally adapted to his work; that he have a broad intellect, business ability and untiring industry. He must be a student of his work, he must keep apace with the times, he can no longer live an isolated life, but he must come forth and jostle with the world. The standard of intellec-

tuality of the farmer must be raised, and the plowshare of thought must tear loose the roots of ignorance.

Remember, that a man's vocation is what he makes it; that it is not the work that honors the man, but the man that honors the work. Remember, that the preservation of democratic institutions depends upon the education and advancement of the laboring classes, and that unless the idea that labor is degrading can be eradicated, our free government is in danger. But if we can establish the idea that labor is noble and that the tiller of the soil is nature's true nobleman, the permanency of our free institutions is fixed.

**Ohio Agricultural Experiment Station, Administration Building,
Described as It Will Be Dedicated June 3, 1897.**

The main building of the Ohio Agricultural Experiment Station, located just south of Wooster, and to be dedicated with imposing ceremonies on Thursday, June 3, is a substantial structure, built in fireproof construction, of the warm, yellowish sandstone found on the Station farm. It comprises two portions, an office building 50x70 feet in size, two stories high, and a laboratory wing, 1½ story, 36x68 feet, and is a monument to the contractors, Thomas Stence, of Ashland, and Samuel Ames, of Wooster.

The first floor of the office building is practically a library, being divided by corridors into rooms which serve the combined purpose of offices and libraries, each member of the technical staff having his separate office in which are collected the books pertaining to his special work.

The second floor contains two offices, similar to those on the first floor, and a large room for museum purposes, in which will be stored samples of soils, different varieties of farm and horticultural products, photographs and

other materials illustrative of the Station's work.

The chemical laboratory occupies the larger portion of the rear wing. It is equipped with a small but select assortment of apparatus for chemical research, and looks out, through its large, arched windows, upon the panoramic view to the north.

This laboratory occupies three floors, the basement being used for storage, preparation of samples, etc., the main floor containing the general analytical room, nitrogen room and apparatus room, and the second floor containing a commodious photographic gallery, with its necessary adjuncts of dark room, etc.

In the rear of the main building stand the greenhouses and the biological laboratory, both buildings including stone offices in front with glass houses in the rear.

The station occupies a commanding position, and from the outlook on its tower may be seen many square miles of the most beautiful urban and agricultural scenery to be found in all the broad expanse of this most beautiful of states.

To the north is the city of Wooster, lying on the southward slope of the Applecreek valley and crowned with the buildings of the University of Wooster, belonging to the Ohio Synod of the Presbyterian church, and a symbol both of the intellectual and religious life of our state.

Westward, the wide, deep valley of the Killbuck cleaves the landscape from north to south, its broad slopes dotted with farm buildings and checkered with grain fields, meadows, orchards and wood lots.

Eastward lies the farm of the Station with its numerous dwellings, barns and other buildings; its orchards and broad fields, and its hundreds of test plots, arranged in blocks and tiers, while on the sides, stretching away for miles in every direction, are the beautiful, well kept farms of

Wayne county, with their large barns and elegant dwellings, the whole forming such a panorama of rural beauty as is to be found in very few localities.

The day of dedication, aptly designated as "Ohio Farmers' Day," will be made a notable one by the people of Wooster and Wayne county, marking as it is so important an event to the sturdy tillers of the soil. Complete plans for the day have not been fully made, but besides the exercises of dedication there will be a parade to show the progress of the century in agriculture and business development; addresses by eminent statesmen and foremost agriculturalists, closing at night with a banquet, spectacular productions and fireworks. All the railways will give special low rates to those who desire to witness the exercises.

WATER,

The Most Important Factor in Good Sanitary Conditions—Lecture by Prof. G. A. Knight.

The last lecture of the faculty lecture course was delivered by Professor Knight on Monday, April 5, on "Recent Sanitary Progress in European and American Cities."

"The value of knowledge is estimated," said Professor Knight in leading up to his subject, "by the practical use to which it is put." This is particularly true of knowledge of the present day. Never before have there been so many practical applications of education along many different lines as there are at the present time. Consequently the knowledge gained by research and investigation is of more use to mankind today than formerly.

Probably no field of research has received so much attention nor has been marked by such great advances

as the study of death-producing diseases. Formerly the physician's art was confined entirely to curing diseases. Now his greatest achievements lie in the art of preventing them. It is in the pursuance of this thought that the study of bacilli has taken such a prominent place in the scientific world. The science of hygiene as it is understood today, owes much to the knowledge that has been received from the study of bacteria. Sanitary science, as it is called, deals with communities, and to accomplish its ends it utilizes all branches of knowledge. The rapid strides that it is making today are due to this fact.

The treating of diseases from a preventive point of view adds new responsibility to the State. The fact that a preventive is known for a disease makes it imperative that the State should immediately adopt measures to utilize that preventive. In this, however, much negligence has been manifested. The State is slow to act and it is only some direful epidemic that arouses a government to immediate action. Thus, while the epidemic of cholera at Hamburg was an awful calamity, it ultimately resulted in great good by awakening the people to the need of some remedy. "It will be well," said the professor, "when the State learns that it is good business and good sense to spend money for hygienic purposes. The State will appropriate one hundred thousand dollars to experiment with a cure for hog cholera, while it will appropriate only twenty-five thousand for the hygienic conditions of its citizens."

Legislation for hygiene is hampered to a great extent by the fact that the accomplishment of the desired ends requires compulsory measures to be used. The people do not cooperate with the State in trying to secure better hygienic conditions. This is but the price of self-government. Public health should be close-

ly guarded, and to do this requires special attention to the source and supply of water and to the rapidity with which impurities are removed from the communities. Of the thirteen heads under which Billings classifies the requisites of a good city government, sanitary measures are placed among the first.

The question of the water supply is one of the most important to city governments. For the last twenty years the means of securing pure water in sufficient quantities has proved a difficult problem. Three object lessons have been given to the world on this question, from which great practical good has emanated. These were the epidemics of typhoid fever in Munich and of cholera at Naples and Hamburg. At Munich the water supply was received from a river and from wells within the city limits. The death rate from typhoid fever became alarming, and it was decided to bring the water from the Alps, a considerable distance. Within three years after the change was made the death rate was only one-tenth of what it had formerly been.

At Naples the state government appropriated twenty millions of dollars for the improvement of the sanitary conditions of the city. Pure water was supplied, the sewerage improved, the old tenement houses in the slums torn away and new houses built, and in one year the death rate was reduced from thirty-three thousand to twenty-eight thousand. The object lesson that has been of the greatest benefit to the world is that of Hamburg. This city secured its water supply from the river at a dangerously short distance from the city. An examination of the water disclosed thirty-three thousand cholera germs in a cubic centimeter. Every year cholera swept away hundreds of the inhabitants. The city took steps to improve the method of securing water. The source of the supply was moved farther up the

river, a filtration system was put in operation, and the formerly disease-carrying water was made perfectly pure. The death rate was greatly reduced, and one year the city escaped the cholera entirely. This practically demonstrates that by a filtration system any city can have pure water.

Professor Knight next discussed the questions of pure food, improvements in sewerage systems and street cleaning. It is interesting to note that the advent of lady bicyclists and the protests that they have made against filthy streets has aided much in securing cleaner streets.

Berlin is a model city for cleanliness. Hundreds of men and boys are constantly at work cleaning the streets, at an annual expense of half a million dollars. Boxes are placed along the curb at a distance of five hundred feet apart for receiving all waste paper and other similar refuse, and it is a punishable offense to throw anything on the street. The three great obstacles to cleanliness in American cities are the great area covered by the cities, the defective streets and the failure of the people to aid in keeping the streets clean.

The closing thoughts of the lecture were upon the subjects of building laws and tenements, with the final statement that to secure the best conditions of municipal government the plans must be raised above partisan politics.

Notes.

Mr. F. P. Stump, '92, one of the founders of the Agricultural Student, and for two years superintendent of the University Farm, has recently purchased the Ohio Creamery and Cheese Factory. We wish Mr. Stump success in his new field of labor.

During the past week Prof. W. R. Lazenby was asked to name a suitable can-

didate for Professor of Agriculture in a new Western college. After consultation with Professor Hunt, two recent graduates of the College of Agriculture were recommended for the place. The salary is from \$1,500 to \$1,800.

The Department of Horticulture and Forestry received quite a large shipment of trees and shrubs from the Albaugh Nursery Company of Montgomery county a short time ago. The transplanting of these afforded some practical lessons to the class in elementary horticulture, and will still further adorn our already beautiful campus.

Dr. Blesch, a well known physician of Columbus, has just donated the Horticultural Department of the University four strong colonies of Italian honey-bees, together with numerous apiarian fixtures. This will give the department an opportunity to give instruction and training in practical bee-keeping.

We are pleased to learn of the continued success of our graduates in various parts of the country. Professors Bogue and Bane in the Agricultural College of Oklahoma, Mr. A. G. Abbott as superintendent of the farm at Purdue University, Indiana, and Professors Selby, Bloomfield and Crowner at the Ohio Experiment Station, are earning well deserved reputations as earnest, progressive young men in their respective lines of work.

Mr. Philip L. Pfarr, '96, is now situated in Columbus. After leaving O. S. U. he was engaged as operator of a creamery at Mt. Pleasant, O. From there he went to Wheeling, where he started up a dairy and did very well, but finding a good buyer he sold out, and is now located in the capital city.